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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,920	09/11/2003	Raymond S. Tetrick	884.A31US2	6016

21186	7590	02/18/2005

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EXAMINER
BRAGDON, REGINALD GLENWOOD

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 02/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>21 January 2005</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
     closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>21-40</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>21-40</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>11 September 2003</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
            application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Terminal Disclaimer

1.   The terminal disclaimer filed on 21 January 2005 disclaiming the terminal portion of any

patent granted on this application which would extend beyond the expiration date of 6,622,212

has been reviewed and is accepted. The terminal disclaimer has been recorded.

Drawings

2.   The drawings are objected to under 37 CFR 1.83(a). The drawings must show every

feature of the invention specified in the claims. Therefore, the limitation of "wherein if the

success rate is below a threshold then prefetching is not performed" must be shown or the

feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to

the Office action to avoid abandonment of the application. Any amended replacement drawing

sheet should include all of the figures appearing on the immediate prior version of the sheet,

even if only one figure is being amended. The figure or figure number of an amended drawing

should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure

must be removed from the replacement sheet, and where necessary, the remaining figures must

be renumbered and appropriate changes made to the brief description of the several views of the

drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

be notified and informed of any required corrective action in the next Office action. The

objection to the drawings will not be held in abeyance.

Specification

3.   The specification is objected to as failing to provide proper antecedent basis for the

claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the

following is required: there is no support for the term "threshold" in the specification.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

5.   Claims 34-40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with

the written description requirement. The claim(s) contains subject matter which was not

described in the specification in such a way as to reasonably convey to one skilled in the relevant

art that the inventor(s), at the time the application was filed, had possession of the claimed

invention.

As per claim 34, it is not clear where Applicant has support in the specification for

"wherein if the success rate is below a threshold then prefetching is not performed".

All dependent claims are rejected as having the same deficiencies as the claims they

depend from.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.   Claims 21-24, 26-32, and 34-40 are rejected under 35 U.S.C. 102(b) as being anticipated

by Macon, Jr. et al. (5,600,817).

As per claim 21, Macon, Jr. et al. teaches a read-ahead ("prefetch") process for a mass

storage ("*input/output device*") system. A portion of a cache in the main memory (DCACHE 7)

is set aside as a "Most Recently Read-Ahead Section" or MRRS. The system includes a file

system 10 ("*I/O control circuit*"), which may be embodied in hardware or software. See column

4, lines 43-51. The file system includes read-ahead functionality (Length 16, COMP 14, Address

12, and CONT 18) ("*a prefetch circuit to prefetch a data block into the memory in advance of a*

subsequent read from the I/O device"). The address value A1 represents the "preceding address"

upon which the predicted prefetch address is based (in that the read precedes the prefetching).

See column 7, lines 30-32. The address value A2 (derived from A1+L, the number of units to

prefetch value) represents the "predicted address", and data is prefetched for this address value.

See column 7, lines 32-34. The address value A2 is stored in the MRRS. See column 7, line 36.

When an next address is "demanded", the address is compared to the address (in this case A2)

associated with the MRRS ("*wherein the subsequent read is tracked to determine if the*

subsequent read reads from the predicted address"). See column 5, lines 11-17, and column 7,

lines 37-39. Macon, Jr. et al. further teaches, with reference to figure 6, that if there is a MRRS miss (i.e. the demand address does not match the value in the MRRS) and a DCACHE hit (step "I"), no prefetching occurs (processing goes to step "O") ("*the prefetch circuit is adapted to bias itself in favor of prefetching or against prefetching*").

As per claim 22, CONT 18 represents a state machine, and it performs the function of updating, or adjusting, the MRRS value and the length 16 value. See column 5, lines 20-47.

As per claim 23, the read ahead functionality is located within the file system 10 which corresponds to the claimed "*I/O control circuit*" as detailed above.

As per claim 24, the file system, in which the read ahead functionality resides, is an interface for main memory 3, CPU 2, and mass storage 4.

As per claim 26, Macon, Jr. et al. teaches, with reference to figure 6, that as long as there is a first hit in the MRRS (step "B", where the address value in the MRRS is the predicted address and a hit represents the demand address matching the address in the MRRS as set forth in column 5, lines 48-50), then prefetching of a number L of units continues (step "G").

As per claim 27, Macon, Jr. et al. teaches, with reference to figure 6, that if there is a MRRS miss (i.e. the demand address does not match the value in the MRRS) and a DCACHE hit (step "I"), no prefetching occurs (processing goes to step "O").

As per claim 28, Macon, Jr. et al. teaches a CPU 2 ("*a processor*") and a mass storage 4 ("*an Input/Output (I/O) device*"). The system includes a file system 10, which may be embodied in hardware or software. See column 4, lines 43-51. The file system includes read-ahead functionality (Length 16, COMP 14, Address 12, and CONT 18). The address value A1 represents the "preceding address" upon which the predicted prefetch address is based (in that

the read precedes the prefetching). See column 7, lines 30-32. The address value A2 (derived

from A1+L, the number of units to prefetch value) is used to prefetch data (*"the prefetch

interface predicts an address needed within the I/O device to satisfy the request"*). See column

7, lines 32-34. The address value A2 is stored in the MRRS. See column 7, line 36. When an

next address is "demanded", the address is compared to the address (in this case A2) associated

with the MRRS (*"the prefetch interface tracks its performance"*). See column 5, lines 11-17, and

column 7, lines 37-39. Macon, Jr. et al. teaches, with reference to figure 6, that as long as there

is a first hit in the MRRS (step "B", where the address value in the MRRS is the predicted

address and a hit represents the demand address matching the address in the MRRS as set forth

in column 5, lines 48-50), then prefetching of a number L of units continues (step "G") (*"biases

in favor...prefetching additional data in advance of subsequent requests based on success

rates"*). Macon, Jr. et al. further teaches, with reference to figure 6, that if there is a MRRS miss

(i.e. the demand address does not match the value in the MRRS) and a DCACHE hit (step "I"),

no prefetching occurs (processing goes to step "O") (*"biases...against prefetching additional

data in advance of subsequent requests based on success rates"*). The MRRS is representative of

prior prefetched data (most recently read ahead section), where a first hit in the MRRS results in

further prefetching.

As per claim 29, Macon, Jr. et al. teaches that the entire address value in the MRRS must

match the demand value (column 5, lines 48-50). Therefore, "at least a portion of the prefetched

data" satisfies the request.

As per claim 30, as set forth in figure 6, the prefetching is configured to adjust whether or not to prefetch, and how much to prefetch (the L value) based on hits or misses in the MRRS and Dcache.

As per claim 31, CONT 18 represents a state machine, and it performs the function of updating, or adjusting, the MRRS value and the length 16 value. See column 5, lines 20-47.

As per claim 32, CONT 18 controls whether prefetching occurs (i.e. step G of figure 6 is performed) or does not occur (step G is not performed). See figure 6.

As per claim 34, this claim is rejected for the reasons set forth for claim 28, above, noting that the "success" rate is based on a hit or miss of the value in the MRRS register as compared to the demand value. The "threshold" is a 1st MRRS hit.

As per claim 35, this claim is rejected for the reasons set forth for claim 27, above.

As per claim 36, this claim is rejected for the reasons set forth for claim 26, above.

As per claims 37-38, the address value A1 represents the "prior read request" upon which the predicted prefetch address is based (in that the read precedes the prefetching).

As per claim 39, Macon, Jr. et al. teaches that the entire address value in the MRRS must match the demand value (column 5, lines 48-50). Therefore, "at least a portion of the prefetched data" satisfies the request.

As per claim 40, CONT 18 represents a state machine, and it performs the function of updating, or adjusting, the MRRS value and the length 16 value. See column 5, lines 20-47.

Response to Arguments

8.   Applicant's arguments filed 21 January 2005 have been fully considered but they are not

persuasive.

With respect to the remarks on page 7 (under "§102 Rejection of the Claims") through

page 8, line 12, the claimed biasing is shown in figure 6 (step "F") where if there is a 1st MRRS

hit, then a prefetch occurs; if this is not the 1st MRRS hit, then prefetching doesn't occur. The

MRRS is representative of prior prefetched data (most recently read ahead section), where a first

hit in the MRRS results in further prefetching.

It is noted that Applicant has left off the actual line numbers in the phrase "col. 5, lines"

on page 8, line 1 and the actual column/line numbers in the phrase "col. 39-45" on page 8, line 7.

It is not clear how the paragraphs at page 8, line 13, to page 9, line 2, distinguish the

claimed invention from Macon, Jr. et al. The "features" do not appear to have any support in the

claim language nor do the alleged "differences" between Macon, Jr. et al. and Applicant's

interpretation of the invention serve to distinguish the claim language from the applied reference.

Conclusion

9.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

10.   Any response to this final action should be mailed to:

> Box AF
>> Commissioner of Patents and Trademarks
>> Washington, D.C. 20231

> All "OFFICIAL" patent application related correspondence transmitted by FAX
must be directed to the central FAX number at **(703) 872-9306**:

> "INFORMAL" or "DRAFT" FAX communications may be sent to the Examiner
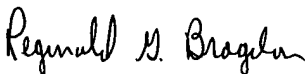at **(571) 273-4204**, only after approval by the Examiner.

>> Hand-delivered responses should be brought to Crystal Park II, 2121
>> Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

11.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Reginald G. Bragdon whose telephone number is (571) 272-
4204. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM
and every other Friday from 7:00 AM to 3:30 PM.

> The examiner's supervisor, Mano Padmanabhan, can be reached at (571) 272-4210.

> Any inquiry of a general nature or relating to the status of this application should be
directed to the Group receptionist whose telephone number is (703) 305-3900.

Reginald G. Bragdon
Primary Patent Examiner
Art Unit 2188

RGB
February 17, 2005